

Winds, influenced in their direction by the occurrence of the Lunar Apsides, with some concluding observations on the result." By Luke Howard, Esq., F.R.S., &c.

From the Tables here given, the author draws the following conclusions:—

1. The barometer is higher under the lunar apogee, than under the perigee; the mean height in the former case being $29\cdot84517$, and in the latter, $29\cdot75542$.

2. The mean temperature is lower under the apogee than under the perigee; that of the former being $48^{\circ}\cdot7126$, and of the latter, $49^{\circ}\cdot0356$. The mean of the whole year was $48^{\circ}\cdot7126$.

3. The rain of the weeks following the apsis exceeds that under the perigee; but with two striking exceptions in the annual result of nine years, the one in the wettest, and the other in the driest year of the cycle.

With regard to the winds, the author remarks that those from the north, north-east, and east, prevailed under the apogee on 38 days, under the perigee on 21 days; and those from the south, south-west, and west, prevailed under the apogee on 20 days, under the perigee on 38 days.

It appears, therefore, that in the climate of London, the moon in her perigee brings over us the southern atmosphere, which tends to lower the density and raise the temperature of the air, occasioning also a larger precipitation of rain. In the apogee, on the contrary, there is a freer influx of air from the northward, a higher barometer, a lower temperature, and less rain; subject, however, to a large addition of rain under this apsis twice in a cycle of nine years, at the times when also the extremes of wet and dry take place on the whole amount of the year.

A paper was also read entitled, "Experimental Researches into the strength of Pillars of Cast Iron, and other materials." By Eaton Hodgkinson, Esq. Communicated by Peter Barlow, Esq., F.R.S., &c.

The author finds that in all long pillars of the same dimensions, the resistance to crushing by flexure is about three times greater when the ends of the pillars are flat, than when they are rounded. A long uniform cast-iron pillar, with its ends firmly fixed, whether by means of disks or otherwise, has the same power to resist breaking as a pillar of the same diameter, and half the length, with the ends rounded, or turned so that the force would pass through the axis. The strength of a pillar with one end round and the other flat, is the arithmetical mean between that of a pillar of the same dimensions with both ends round, and one with both ends flat. Some additional strength is given to a pillar by enlarging its diameter in the middle part.

The author next investigated the strength of long cast-iron

pillars with relation to their diameter and length. He concludes that the index of the power of the diameter, to which the strength is proportional, is 3·736. He then proceeds to determine, by a comparison of experimental results, the inverse power of the length to which the strength of the pillar is proportional. The highest value of this power is 1·914, the lowest, 1·537, the mean of all the comparisons, 1·7117. He thus deduces, first, approximate empirical formulæ for the breaking weight of solid pillars, and then proceeds to deduce more correct methods of determining their strength.

Experiments on hollow pillars of cast iron are then described, and formulæ representing the strength of such pillars are deduced from these experiments.

After giving some results of experiments still in progress for determining the power of cast-iron pillars to resist long-continued pressure, the author proceeds to determine from his experiments the strength of pillars of wrought iron and timber, as dependent on their dimensions. The conclusion for wrought iron is, that the strength varies inversely as the square of the pillar's length, and directly as the power 3·75 of its diameter, the latter being nearly identical with the result obtained for cast iron; for timber, the strength varies nearly as the 4th power of the side of the square forming the section of the pillar. Experiments for determining the relation of the strength to the length in pillars of timber, were not instituted, as, from the great flexure of the material, it was considered that no very satisfactory conclusions on this point could be derived experimentally.

In conclusion, the author gives the relative strengths of long pillars of cast iron, wrought iron, steel, and timber.